

In the Claims:

Cancel claim 4, without prejudice or disclaimer.

6. (Four times Amended) A metallurgical structure comprising:
a passivation layer;
a via through said passivation layer extending to a metal line within said metallurgical structure;
a barrier layer lining said via;
a metal plug in said via above said barrier layer, wherein said metal plug and said metal line comprise a same material, and wherein said metal plug, said barrier layer and said passivation layer form a planar exterior surface of said metallurgical structure; and
a solder bump formed on said planar exterior surface;
wherein said solder ball is in direct contact with said metal plug,
and wherein said metal plug forms sufficient intermetallics with elements diffusing from said solder bump so as to prevent said elements from penetrating through said barrier layer into said metal line.

13. (Four times Amended) An integrated circuit structure comprising:
internal components within an exterior covering;
a via extending through said exterior covering to said internal components;
a barrier layer lining said via;
a plug in said via above said barrier layer, wherein said plug and said internal components comprise a same material, and wherein said plug and said barrier layer form a planar exterior surface of said integrated circuit structure; and
a connector formed on said planar exterior surface;
wherein said connector is in direct contact with said plug,
and wherein said metal plug forms sufficient intermetallics with elements diffusing from said

*E²
cont*

solder bump so as to prevent said elements from penetrating through said barrier layer into said metal line.

*E³
cont
E¹*

23. (Amended) A metallurgical structure, comprising:
 forming a first layer of copper on a substrate;
 forming a barrier layer on said first layer of copper;
 forming a second layer of copper formed on said barrier layer; and
 forming a conductive structure that includes a given species, at least some of said given species diffusing from said conductive structure, said second layer of copper having a thickness sufficient to form intermetallics with said species diffusing from said conductive structure, and to adhere to said conductive structure, so as to prevent said species from penetrating through said barrier layer into said first layer of copper.

Remarks

Applicants respectfully request that this amendment be entered, and that their subject U.S. Patent application be passed to issuance in view thereof. The foregoing amendments are further indicated in blackline form in Exhibit A, "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

In the Office Action, the pending claims stand rejected as being obvious in view of U.S. Patent 5,290,732 ("Kumar") and U.S. Patent 5,674,787 ("Zhao"). All of the rejections of record are based on Kumar's and Zhao's teachings. In this Amendment, independent claims 6 and 13 have been amended to specify that the metal pad forms intermetallics with elements diffusing out of the solder ball, so as to prevent penetration of those elements through the barrier layer into the underlying metal line. Independent claim 22 has been amended similarly.

The Examiner suggests that preventing formation of such intermetallics would be an inherent